CLAIMS:

1. A high pressure discharge lamp, comprising:

a quartz glass bulb;

a conductive element which is airtightly sealed at a sealing portion of said quartz glass bulb; and

a pair of electrodes, each electrode of said pair of electrodes being disposed in said quartz glass bulb so as to be opposite the other and each electrode of said pair of electrodes being connected to said conductive element, wherein

a part of each electrode of said pair of electrodes is sealed with said quartz glass bulb at said sealing portion so as to generate a contacting portion formed by the part of each electrode of said pair of electrodes and said quartz glass bulb, and

the maximum length, L_{max}, of the contacting portion is defined as:

L_{max} (mm) $\leqq$ 200 / (P $\times$ D); and

the minimum length, L_{min}, of the contacting portion is defined as:

L_{min} (mm) $\geqq$ 0.8 / ($D^2 \times \pi$) or

L_{min} (mm) $\geqq$ 0.7 whichever is longer,

where D is the diameter (mm) of the corresponding electrode of said pair of electrodes and P is the power (W) supplied to the corresponding electrode of said pair of electrodes.

2. A high pressure discharge lamp according to claim 1, wherein said conductive element is molybdenum foils.

3. A high pressure discharge lamp according to claim 1, wherein

the maximum value, R_{max}, of the surface roughness of said pair of electrodes at the contacting portion is about 5 μ m or less,

where R_{max} is the maximum of the absolute value of the difference between the distance from the axial center of each of said electrodes to a particular point on the surface of each of said electrodes and the mean value of the distance.

4. A high pressure discharge lamp according to claim 2, wherein the maximum value, R_{max}, of the surface roughness of said pair of electrodes at the contacting portion is in the range between about 2 μ m and 3 μ m.

5. A method for sealing a bulb of a high pressure discharge lamp including a first electrode and a second electrode, said first and second electrodes being disposed in said bulb having a first insertion opening and a second insertion opening so as to be opposite the other, comprising the steps of:

disposing said first electrode at said first insertion opening so that said first electrode is placed at a predetermined position in the axial direction;

heating a predetermined portion of said first insertion opening while maintaining a pressure difference between the inside and outside of said bulb;

shrinking said predetermined portion of said first insertion opening in a natural state so that a part of said first electrode is sealed with said predetermined portion;

disposing said second electrode at said second insertion opening so that said second electrode is placed at a predetermined position in the axial direction;

heating a predetermined portion of said second insertion opening while maintaining a pressure difference between the inside and outside of said bulb; and

shrinking said predetermined portion of said second insertion opening in a natural state so that a part of said second electrode is sealed with said predetermined portion, wherein

the length of a contacting portion formed by sealing said part of said first electrode with said bulb, and by said part of said second electrode with said bulb, is in the range between:

a maximum length, L_{max}, defined as:

L_{max} (mm) $\leqq$ 200 / (P $\times$ D); and

a minimum length, L_{min}, defined as:

L_{min} (mm) $\geqq$ 0.8 / ($D^2 \times \pi$) or

L_{min} (mm) $\geqq$ 0.7 whichever is longer,

where D is the diameter (mm) of said first electrode or said second electrode and P is the power (W) supplied to said first electrode or said second electrode.

6. A high pressure discharge lamp, comprising:

a quartz glass bulb;

conductive elements, said conductive elements being airtightly sealed at sealing portions of said quartz glass bulb; and

a pair of electrodes, each electrode of said pair of electrodes being disposed so as to be opposite the other and each of said electrodes being connected to one of said conductive elements, wherein

R_{max} of an end portion of each of said electrodes is about 5 μ m or less,

where R_{max} is the maximum of the absolute value of the difference between the distance from the axial center of each of said electrodes to a particular point on the surface of

each of said electrodes and the mean value of the distance.

7. A high pressure discharge lamp according to claim 6, wherein said conductive elements are molybdenum foils.

8. A high pressure discharge lamp according to claim 6, wherein

the length of said end portion of each of said electrodes is in the range between about P/150 and P/100 mm from an end of each of said electrodes along the length of each of said electrodes,

where P is a supplied power to said high pressure discharge lamp in watts.

9. A high pressure discharge lamp according to claim 6, wherein the maximum value of the surface roughness of the end portion of each of said electrodes is about 3 μ m or less.

10. A high pressure discharge lamp according to claim 6, wherein the maximum value of the surface roughness of the end portion of each of said electrodes is about 1 μ m or less.

11. A high pressure discharge lamp according to claim 6, wherein the maximum value of the surface roughness of the end portion of each of said electrodes is about 0.5 μ m or less.

12. A high pressure discharge lamp according to claim 6, wherein the maximum

value of the surface roughness of a portion other than the end portion of each of said electrodes is in the range between about 5 μ m and 12 μ m.

13. A high pressure discharge lamp according to claim 6, wherein the maximum value of the surface roughness of a portion other than the end portion of each of said electrodes is in the range between about 7 μ m and 9 μ m.

14. A high pressure discharge lamp according to claim 6, wherein

mercury vapor is contained in the high pressure discharge lamp in an amount between about 0.12 and 0.3 mg/mm^3.

15. A high pressure discharge lamp according to claim 6, wherein

a halogen gas is contained in the high pressure discharge lamp in an amount between about 10^{-8} and 10^{-2} μ mol/mm^3.

16. A high pressure discharge lamp according to claim 6, wherein

an inert gas is contained in the high pressure discharge lamp with a pressure of about 6 kPa or more.

17. A high pressure discharge lamp according to claim 6, wherein said pair of electrodes comprises tungsten containing potassium oxide.

18. A high pressure discharge lamp according to claim 6, wherein the bulb wall loading in the high pressure discharge lamp is about 0.8 W/mm^2 or more.

19. A high pressure discharge lamp according to claim 6, wherein the end portion of each of said electrodes has a surface, said surface being polished by a composite electrolytic polishing method.